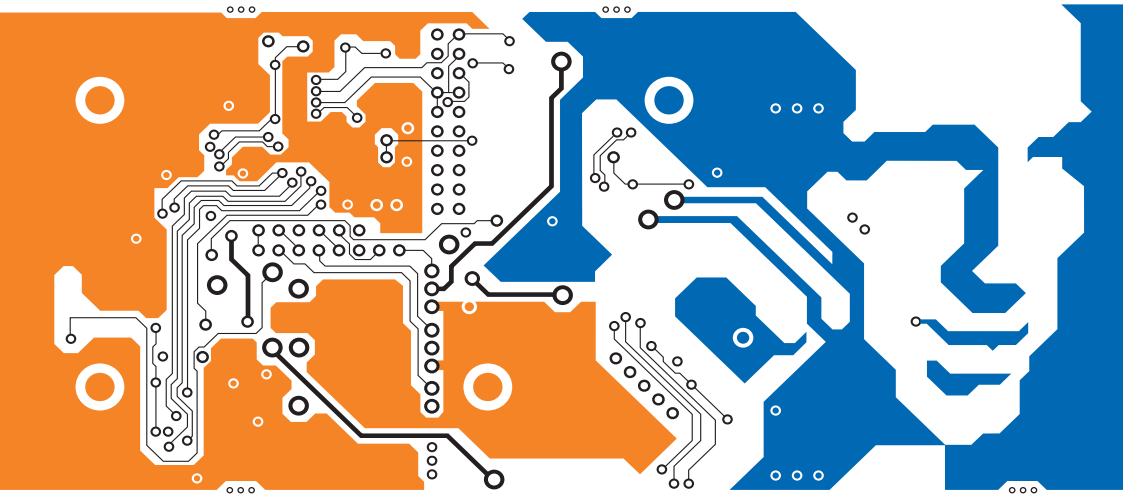
CODAN

SSB Transceiver

2110

HF RADIO COMMUNICATIONS



GETTING STARTED GUIDE

Codan part number 15-04136-EN Issue 1, November 2004

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Introduction

Thank you for purchasing a Codan 2110 SSB Transceiver. With this great product and Codan's supreme after-sales support, you can look forward to many years of clear and reliable HF communication. Please read this guide thoroughly and retain it for future reference.

The 2110 SSB Transceiver is a self-contained, lightweight, waterproof and rugged communication system.

Overview of this guide

This guide provides instructions on how to get started with your 2110 SSB Transceiver. It assumes that you have limited knowledge of HF communication and of using an HF radio.

This guide contains the following sections:

Section 1	2110 SSB Transceiver compliance—provides compliance information and safety notices, and information on specific care and safety requirements for your transceiver
Section 2	Your 2110 SSB Transceiver—explains briefly the components that make up your transceiver
Section 3	Preparing the 2110 SSB Transceiver for use—explains briefly how to check that the transceiver and battery are ready for use
Section 4	The front panel—describes the front panel and the function of items on the front panel
Section 5	Getting started—explains how to use the basic operating features of your transceiver
Section 6	Troubleshooting—provides solutions for common operational issues for the 2110 SSB Transceiver
Appendix A	Entering and editing text—explains how to enter and edit text in editable screens

Appendix B Using Quick Start—explains how to use the Quick Start feature, if enabled

Appendix C Using the GPS receiver—explains the information provided by the GPS receiver, if fitted

Appendix D Transceiver specifications—provides the common operational specifications of the transceiver

Appendix E HF radio transmission—describes the medium of HF communication and how to use it effectively

Appendix F Definitions—explains the terms and abbreviations used in this guide

Appendix G Warranties—explains the warranties associated with the components of the 2110 SSB Transceiver

There is an index at the end of this guide and a CD containing extensive reference material.

Accessing the CD

To access the CD:

- ❑ Place the CD in the CD drive of your computer.

  The CD will automatically launch the 2110 SSB Transceiver Reference Manual as a fully text-searchable HTML help file.

1 2110 SSB Transceiver compliance

This section contains the following topics:

Introduction

This section describes how to ensure the 2110 SSB Transceiver complies with the European Electromagnetic Compatibility Directive 89/336/EEC and the European Low Voltage Directive 73/23/EEC as called up in the European Radio and Telecommunications Terminal Equipment Directive 1999/5/EC.

The CE Declaration of Conformity and Expert Letter of Opinion for the product is listed on page 73, *Associated documents*. This document can be made available upon request to Codan or a Codan-authorised supplier.

This section also contains the requirements for C-tick.

European Radio and Telecommunications Terminal Equipment Directive

The 2110 SSB Transceiver has been tested and complies with the following standards and requirements (articles of the R&TTE Directive):

- Article 3.1b: ETSI EN 301 489-1
- Article 3.1b: ETSI EN 301 489-15
- Article 3.2: Australian type approval according to AZ/NZS 4770:2003
- Article 3.1a: assessed against ICNIRP requirements
- Article 3.1a: EN 60950

Compliance with these standards is deemed sufficient to fulfil the requirements of the R&TTE Directive 1999/5/EC.

Product marking and labelling

Any equipment supplied by Codan that satisfies these requirements is identified by the CE0191 !, CE0191 or CE markings on the model label of the product.

Declaration of Conformity and Expert Letter of Opinion

The CE Declaration of Conformity and Expert Letter of Opinion for this product is listed on page 73, *Associated documents*. This document can be made available upon request to Codan or a Codan-authorised supplier.

Protection of the radio spectrum

CAUTION

Most countries restrict the use of HF radio communications equipment to certain frequency bands and/or require such equipment to be licensed. It is the user's responsibility to check the specific requirements with the appropriate communications authorities. If necessary, contact Codan for more information.

Electromagnetic compatibility and safety notices

Radiation safety

To ensure optimal transceiver performance and to avoid exposure to excessive electromagnetic fields, the antenna system must be installed according to the instructions provided.

WARNING

High voltages exist on the antenna during transmission and tuning. Do not touch the antenna during these activities. RF burns may result.

WARNING

Install the grounding system or counterpoise as directed to prevent RF burns from any metal part of the transceiver.

WARNING

You should not transmit from your transceiver or tune the antenna unless people are beyond the safe working distance of:

- 0.2 m (8 in) from a long wire, end-fed broadband, broadband dipole, or wire dipole antenna
- 0.6 m (2 ft) from any whip antenna

Safe working distance is based on continuous exposure to CW type transmissions, as set out in the ICNIRP Exposure Guidelines 1998 for occupational exposure. Safe working distance can be reduced with normal voice communication.

Electromagnetic compatibility

To ensure compliance with the EMC Directive is maintained, you must:

- ❑ Cover unused connectors with the protective caps supplied to prevent electrostatic discharge passing through your equipment.

Electrical safety

To ensure compliance with the European Low Voltage Directive is maintained, you must deploy and use the 2110 SSB Transceiver and antennas in accordance with the instructions in the *2110 SSB Transceiver Getting Started Guide*, the *Quick Reference Cards* supplied with each antenna, and the *2110 SSB Transceiver Reference Manual*.

When using equipment that is connected directly to the AC mains these precautions must be followed and checked before applying AC power to the unit:

- ❑ Use the standard AC mains cable supplied.
- ❑ Ensure the covers for the equipment are fitted correctly.

  The 3121 AC Battery Charger is double insulated and marked with ⧈.

CAUTION	If it is necessary to remove the covers during service by a qualified electronics technician, they must be refitted correctly before using the equipment.
WARNING	The protective cover must always be fitted when the 3121 AC Battery Charger is connected to the AC mains.

Batteries

Battery cells are electrically live at all times and must be treated with extreme caution. They may supply high short-circuit currents even if they appear to be damaged or inoperable.

Batteries should be used to provide power to the transceiver only, using the supplied connectors.

The batteries will not charge at temperatures higher than 40°C.

Earth symbol

An antenna earth connection point is provided on the 2110 SSB Transceiver. The symbol shown in Table 1 is used to identify the earth on the equipment.

Table 1: Earth symbol

Symbol	Meaning
	Antenna earth

C-tick approval

The 2110 SSB Transceiver meets the requirements of the Australian Communications Authority Radiocommunications (MF and HF Radiotelephone equipment—Land Mobile Services) Standard 2003 (AS/NZS 4770).

Care and safety information

Storage of batteries

Codan recommends that batteries are fully charged prior to storage. The length of time that they can be stored before recharging is necessary is dependent on the type of battery and the average storage temperature.

Table 2: Battery storage times

Type	Storage time @ 20°C (70°F)	Storage time @ 30°C (85°F)
NiMh	12 months	6 months
SLA	15 months	10 months

Disposal of batteries

Batteries must be recycled. They should not be burnt or disposed of in landfill.

Immersion of the transceiver in water

The transceiver unit and battery pack are designed to be waterproof to IP68. The units can withstand immersion in 1 m (3 ft) of water for up to 1 h. Prolonged immersion may cause damage to the units.

If the units are immersed in water, drain any water from the front panel speaker and keypad, then wipe and air dry the connectors on the units prior to use or charging the battery.

If the units are exposed to salt water, they should be washed with fresh water as soon as possible.

WARNING Do not expose the connector on the battery pack to salt water. This will damage the connector.

Deploying antennas

WARNING Do not deploy the antenna at sites with overhead power cables.

WARNING Do not deploy or use any antenna if there is lightning in the area.

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2 Your 2110 SSB Transceiver

The 2110 SSB Transceiver system has a range of accessories that are used in different situations. The following photographs may help you to identify the transceiver and its typical accessories.

Transceiver with handset

Battery pack

Backpack

Whip antenna

Counterpoise

Wire antenna/halyard

Earth stake

Balun

Battery charger

Coaxial cable

Earth lead with clip and plug

Configuration software and programming cable

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3 Preparing the 2110 SSB Transceiver for use

This section contains the following topics:

Charging a battery

Before using your transceiver, you must ensure that the supplied battery is fully charged. You may use an AC–DC or DC–DC charger with the battery. The AC–DC charger (Type 3121) uses a universal AC mains input of 90–264 V AC. The DC–DC battery charger (Type 3122) may be powered from any 12–60 V DC source, for example, from a vehicle 12 V DC outlet, or from a 24 V vehicle battery.

The Codan battery chargers are specially designed for low-noise operation, so receiver performance remains optimal while charging the battery via the front panel. You can continue to use your transceiver during battery charging.

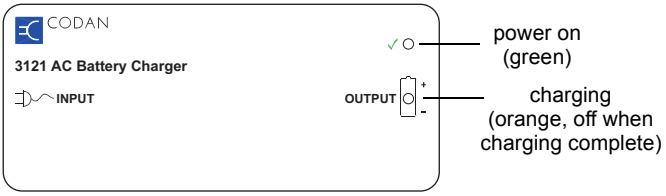
CAUTION

Charging is recommended between 0 and 40°C. The battery will not commence charging if the temperature is at or above 40°C. If charging is already in progress, and the temperature rises to 50°C, charging will be stopped automatically.

CAUTION

To prevent damage to the battery, Codan recommends the use of the Codan battery chargers to charge the battery pack.

Figure 1: Typical front panel of a battery charger



WARNING

The battery pack should be charged with the connector facing upward and the vents clear of obstructions so that any gas created during the charging process is released.

CAUTION Provide clear notification that charging is underway. Ensure there is adequate ventilation around the battery during charging.

To charge a battery:

- ❑ Do one of the following:
  - If the battery is attached to the transceiver, use cable 08-06215-001 to connect the output of the charger to the 19-way connector on the front panel of the transceiver.
  - If the battery is detached from the transceiver, use cable 08-06214-001 to connect the output of the charger to the 6-way connector on the top of the battery pack.
- ❑ Connect the charger to an appropriate power source.

  If the transceiver is operational during charging, the battery status indicator on the screen will show that the battery is charging. When charging is complete, the battery status indicator will be full.

  NOTE It will take approximately 16 seconds for charging to start.

Requirements for alternative chargers

The Codan battery packs may be charged using alternative supplies, for example, solar panels or hand-crank generators. In this situation, the voltage level must not exceed 15.5 V and the current must be within 1–3 A. These chargers must be connected between pin B (charge in) and pin A (ground) on the connector on the battery pack.

Notes on charging batteries

A battery will require 3–5 discharge/recharge cycles when new before it reaches its full capacity. In order to increase the battery service life, it is recommended that the battery *is not* fully discharged during each cycle. Full discharge should only be carried out periodically as follows:

Type	Full discharge
NiMh	Two full discharge/recharge cycles every 20 charge cycles
SLA	One full discharge/recharge cycle every 20 charge cycles

For the periodic full discharge cycle, run the battery down to zero capacity using the transceiver. The transceiver will switch off automatically when the battery is fully discharged.

WARNING If you are using alternative means to discharge the battery, the battery voltage must not go below 10 V.

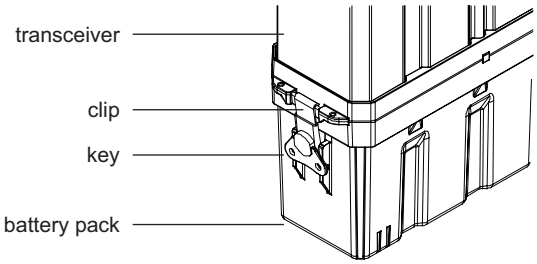
WARNING An SLA battery must be charged immediately after discharge to prevent damage to the battery.

Connecting a battery to the transceiver

The battery is connected to the bottom of the transceiver. It is held in place by clips with locking key latches (see Figure 2).

NOTE — The battery connector on the base of the transceiver is on the same side of the transceiver as the antenna connectors on the front panel.

Figure 2: Transceiver with battery pack connected



Inserting the transceiver into a backpack

All backpacks come with adjustable straps that hold the transceiver firmly in position. Some backpacks have an internal mounting frame.

To insert the transceiver into a backpack with an internal mounting frame:

- ❑ Open the rear of the backpack to expose the mounting frame.
- ❑ Push the transceiver between the foam mounts on the frame.
- ❑ Secure the transceiver with the two adjustable straps.
- ❑ Close the rear of the backpack.

To insert the transceiver into the soft backpack:

- ❑ Slide the transceiver into the backpack.
- ❑ Secure the transceiver with the adjustable strap on the outside of the backpack.

Selecting an appropriate antenna

Use the following table as a guide to selecting an antenna that is appropriate for your communication requirements.

Table 3: Selection guide for antennas

Antenna	Communication distance (km)				Effort to install	Antenna performance
	0–100	100–500	up to 2000	up to 5000		
Tape, Knock-down whip	✓				Minimum	Adequate
3 m (10 ft) collapsible whip	✓	✓				
Long wire and adaptor	✓	✓	✓			
End-fed broadband	✓	✓	✓			
Broadband dipole	✓	✓	✓	✓		
Wire dipole	✓	✓	✓	✓	Maximum	Superior

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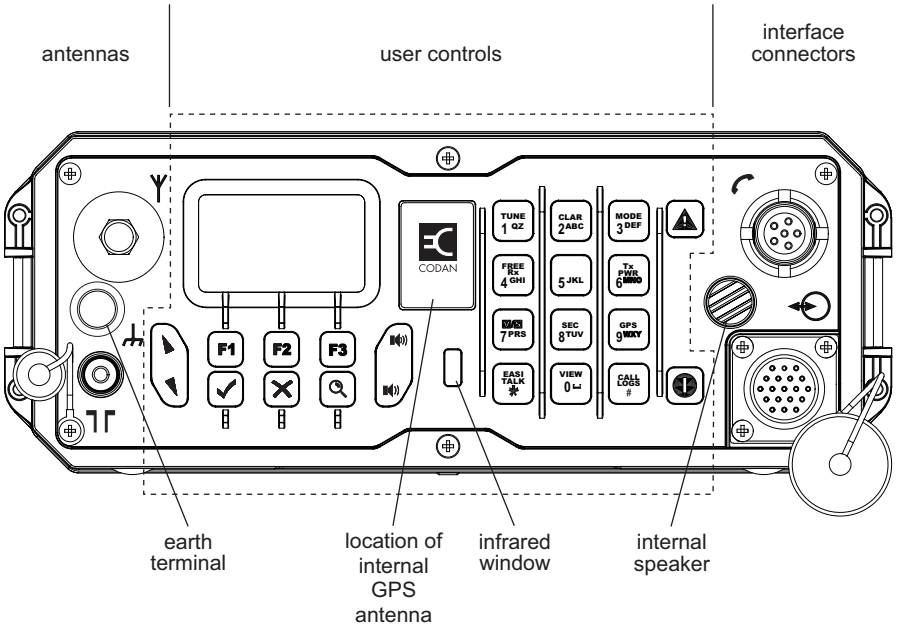
4 The front panel

Overview

The front panel has three main areas: user controls, connectors and antennas, as shown in Figure 3.

Figure 3: The front panel



User controls

The user control area comprises:

- an LCD
- navigation keys (, , , ,)
- volume controls (,)
- soft function keys (**F1**, **F2**, **F3**) corresponding to the function displayed above the key on the front panel screen
- alphanumeric keys (**0**–**9**, *, **#**)
- emergency key ()
- power key ()

There are two ways to use the keys on the front panel. You can:

- press a key, briefly
- *hold* a key for 2 seconds

The and keys

Press to:

- select the item on the active line in the list
- save changes
- answer ‘yes’ to prompts

Hold to edit settings.

Press to:

- navigate up from settings to entries
- backspace over text
- remove messages on the screen
- cancel changes
- answer ‘no’ to prompts

Hold ✕ to go from any location to the home screen. If you have entered text into a setting and want to discard the changes you made, *hold* ✕.

The scroll keys

The ◣ and ◥ keys are the scroll keys. Use these keys to scroll up or down through any list, to scroll left or right over text, and to increase or decrease a value.

Interface connectors

The interface connector area comprises:

- the 6-way handset connector (✆)
- the 19-way GPIO connector (⇜)

Antennas

The antenna area comprises:

- the antenna stud (Ψ) for whip antennas and the long wire antenna adaptor
- the 50 Ω connector (⅂⅂) for broadband and dipole antennas

Hot keys

Hot keys enable you to perform a task quickly. The transceiver comes with some standard hot keys programmed; the keys are labelled with the corresponding task performed. You can also create your own hot keys (see the reference material on the enclosed CD).

Table 4: Standard hot keys

Hot key	Function
F1	Pressing **F1** performs the macro assigned to this soft function key. By default, **MUTE** is assigned to this key, so pressing **F1** toggles mute on or off.
F2	Pressing **F2** performs the macro assigned to this soft function key. By default, **CALL** is assigned to this key, so pressing **F2** starts a call.
F3	Pressing **F3** performs the macro assigned to this soft function key. By default, **SCAN** is assigned to this key, so pressing **F3** switches off scanning, or if you were in a call, ends the call and switches scanning on.
Hold **MUTE**	*Holding* **MUTE** toggles the front panel speaker on or off.
TUNE	Pressing **TUNE** displays the **PTT tunes** screen so you can manually tune the antenna.
CLAR	Pressing **CLAR** enables you to adjust the receive frequency to compensate for any frequency offset between your transceiver and the remote transceiver.
MODE	Pressing **MODE** selects the next allowable mode programmed for the channel, usually USB or LSB.
FREE Rx	Pressing **FREE Rx** enters Free Tune mode in which you can adjust or enter a receive frequency.
Tx PWR	Pressing **Tx PWR** toggles the transmission power of the transceiver between Hi (25 W) and Lo (5 W).

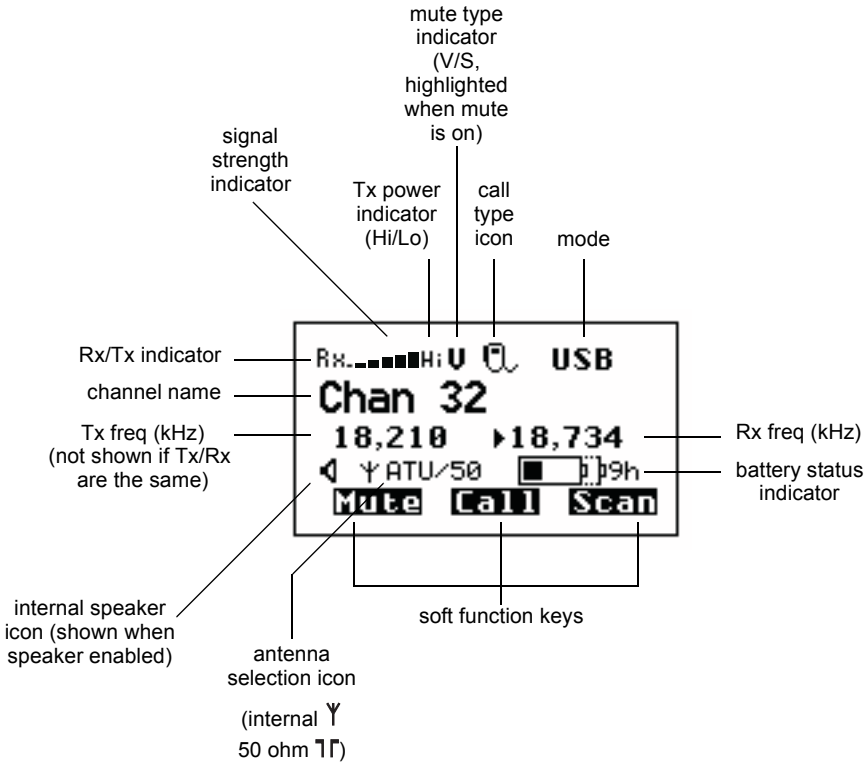
Table 4: Standard hot keys (cont.)

Hot key	Function
V/S	Pressing **V/S** toggles the mute type between Voice mute and Selcall mute.
SEC	Pressing or *holding* **SEC** enters Secure mode, if the hardware option is fitted, and special firmware is programmed into the transceiver and enabled.
GPS	Pressing **GPS** displays your current GPS position, if the hardware option is fitted and enabled.
EASITALK	Pressing **EASITALK** toggles the DSP noise reduction algorithm on or off.
VIEW	Pressing **VIEW** toggles between the channel screen and the Address List.
CALL LOGS	Pressing **CALL LOGS** repeatedly steps through a number of call logs: Calls Out, Calls In, Last Heard, then back to the screen from which you began. In these logs, you can view the details of the calls or detected stations. The Last Heard log is only available if you have the MIL-STD-188-141B ALE option installed.
⚠ (Emergency)	*Holding* ⚠ begins an automatic Emergency call transmission using call information contained in the Emergency entries in the Address List.
(Power)	Pressing cycles the screen and keypad backlighting through the brightness settings.
+ **9**	Pressing + **9** enables you to change the default setting for the screen contrast.
+ **0**	Pressing + **0** enables you to change the default setting for the screen and keypad backlighting.

The channel screen

The channel screen is displayed when you press ✕ or **VIEW**.

Figure 4: The channel screen in the Channel List



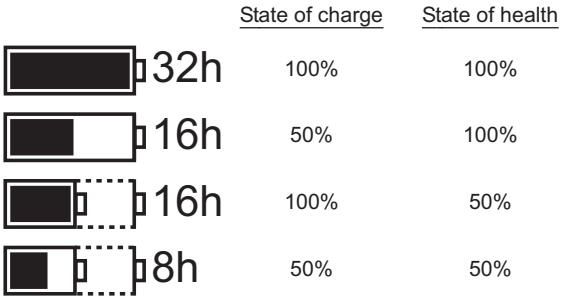
When the transceiver is scanning, the call type icon is replaced by the scanning icon and the channel information is replaced by **Scanning**.

Battery status indicator

The channel screen displays a battery status indicator. The indicator graphically shows the:

- state of charge
- state of health

Figure 5: Battery status indicator



State of charge

The state of charge indicates graphically how much charge is remaining in the battery. The battery continuously monitors the current consumption of the transceiver and calculates the remaining hours of use assuming a Tx to Rx ratio of 1:9.

State of health

Rechargeable batteries have a limited lifetime and a limited number of times that they may be charged and discharged. Over time, the total amount of charge that a battery may hold decreases. The state of health indicates graphically how much charge a battery can still hold, relative to when it was new.

A low state of health indicates that the battery may need replacing.

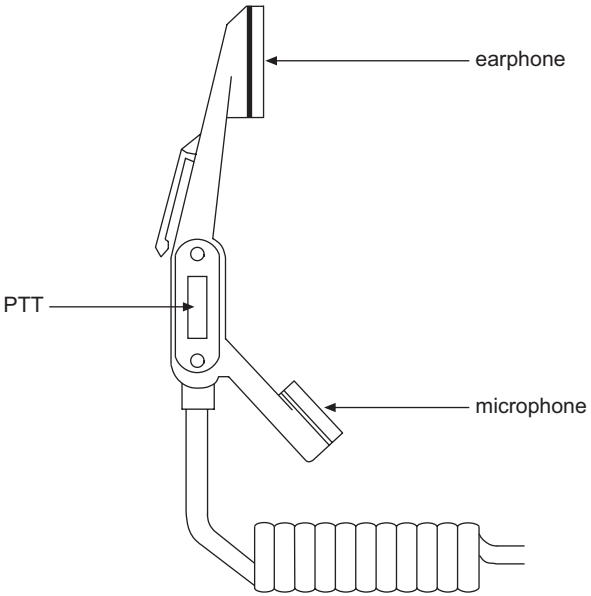
NOTE

When charging a new battery it may show a low state of health until it has been fully charged and discharged several times.

The handset

The 2110 SSB Transceiver supports standard audio accessories using H-229 type connectors. The handset is a standard issue, lightweight, tactical H-250/U type, with built-in earphone, noise-cancelling microphone, and PTT button. It is connected to the 6-way connector on the front panel of the transceiver.

Figure 6: The handset



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5 Getting started

This section contains the following topics:

WARNING

You should not transmit from your transceiver or tune the antenna unless people are beyond the safe working distance of:

- 0.2 m (8 in) from a long wire, end-fed broadband, broadband dipole, or wire dipole antenna
- 0.6 m (2 ft) from any whip antenna

Switching on the transceiver

NOTE

Prior to operational use, you should connect an antenna to the transceiver (see page 21, *Selecting an appropriate antenna*, and the *Quick Reference Card* supplied with the antenna).

To switch on the transceiver:

- ❑ Press ⏻.

  If you are prompted to enter a password, enter your user or administrator password, then press ✔.

  If you enter an incorrect password it is automatically erased. If you enter an incorrect password three times the transceiver automatically switches off.

  When the transceiver is switched on, it runs a self-test that checks the memory, hardware, LCD and keys.

Switching off the transceiver

To switch off the transceiver:

- ❑ *Hold* ⏻.

  The transceiver is switched off.

Setting up basics

NOTE

Basic information for the transceiver, such as channels, self addresses, time and date, and enabling channels for scanning, should be set up by your system administrator using the NGT System Programmer. If Quick Start is enabled you can enter some of this information (see page 49, *Using Quick Start*).

Selecting a channel

To select a channel:

- ❑ Press **VIEW** until the channel screen is displayed.

  If scanning is on, press **SCAN** to switch it off.

- ❑ Scroll through the channels in the list. Stop scrolling when the channel you want is displayed.

  The channel is selected.

- ❑ If you want to change the sideband or IF filter settings, press **MODE**.

  If the mode does not change there is only one mode for the channel.

NOTE If you have an automatic antenna fitted, press PTT to tune the antenna to the currently selected channel.

Making a basic voice call

To make a basic voice call:

- ❑ Select the channel that you want to use (see page 36, *Selecting a channel*).
- ❑ *Hold down* PTT then speak, releasing PTT when you have finished speaking.

Muting the transceiver

If you do not want to listen to on-air noise, you can mute the transceiver so that you will only hear voice traffic on the channel.

To switch mute on or off:

- ❑ Press **MUTE**.

  When the channel screen is displayed, the mute status is indicated by a V (Voice) or S (Selcall) at the top centre of the screen. If the letter is highlighted, mute is on. If the letter is not highlighted, mute is off.

- ❑ Press **V/S** until V is displayed on the channel screen.

  The transceiver will remain muted until it detects voice traffic on the channel.

Making a Selective call

NOTE The call types available will depend on the options installed in your transceiver.

To make a Selective call:

- ❑ Press **CALL**.
- ❑ Enter the address of the station you want to call, scroll to the type of call you want to make, then press **CALL**.

Call type	Icon	Used for...
Channel Test		Testing the audible quality of a channel in a Codan Selcall network. Replacing LQA information for an ALE/CALM network (if you have the MIL-STD-188-141B ALE option installed).
Emergency		Sending an emergency alert tone with a call.
Get Position		Requesting the location of a remote transceiver with a GPS receiver connected and enabled.
Get Status		Requesting diagnostic or configuration information from a remote transceiver.
Message		Sending a message to a remote transceiver.
Phone		Sending a call to a radio/telephone interconnect unit, which connects the call to the public telephone network.
RFDS Emgcy		Sending an emergency call to an RFDS base station (Australia only).

Call type	Icon	Used for...
Selective		Sending a selective call to a remote transceiver.
Send Position		Sending your GPS position to a remote transceiver. A GPS receiver must be fitted and enabled in your transceiver.

- ❑ If you are prompted for details about the call, use the information in the following table to enter them, then press **CALL**.

If this prompt is displayed...	Do this...
Select network	• select the network in which you want to make the call
My address?	• select or enter the self address from which you want to send the call
Select chan/mode	**In an ALE/CALM network:** • select **<auto>** if you want the transceiver to select the best channel/mode for the call, starting with the channel on which the most recent successful link was established, or • select the channel/mode you want to use to make the call, or • if you have the MIL-STD-188-141B ALE option installed, press 🔍 to select the best channel/mode combination from the LQA database **In a Codan Selcall network:** • select the channel/mode you want to use to make the call and check that it is clear of voice and data traffic

NOTE To abort the call before a connection to the other station is made, press PTT.

- ❑ If you made the call in:
  - an ALE/CALM network, wait until a message informs you that the call has been successful (this means your call has been automatically answered by the other station)
  - a Codan Selcall network, wait until a message informs you that the call has been sent and listen for audible beeps transmitted from the other station
- ❑ *Hold down* PTT then speak.

  Release PTT when you have finished speaking.

NOTE

If you have the MIL-STD-188-141B ALE option installed and made the call using a special ALE address syntax, you will be able to send data within the established link by pressing **CALL** and following the prompts.

- ❑ To end the call, press **SCAN**.

  If the transceiver was scanning prior to the call it resumes scanning.

Scanning channels

Before you can switch scanning on, you need to allocate some channels to be scanned. If you have Quick Start enabled you can create a scan list from channels programmed into the transceiver (see page 49, *Using Quick Start*). If this feature is disabled, your system administrator will allocate some channels to a network, then enable scanning of this network.

Switching scanning on or off

To switch scanning on or off:

- ❑ Press **SCAN**.

  Scanning is toggled on or off.

  NOTE

  SCAN is also used to end a call.

  If the transceiver was scanning before the call was sent or received, it resumes scanning. If the transceiver was not scanning before the call, press **SCAN** to switch scanning on.

When scanning is switched on, mute is also switched on.

You cannot use PTT while the transceiver is scanning.

Pausing scanning

To pause scanning:

- ❑ Do one of the following:
  - to pause scanning on the current channel/mode, press ✓
  - to pause scanning and scroll to another channel/mode, press ◣ or ◥

The channel/modes through which you can scroll are those in the networks that were being scanned. They are not listed alphabetically but in the order in which they were being scanned.

If you do not press a key within 30 seconds the transceiver automatically resumes scanning.

❑ While scanning is paused, do one or more of the following:

- to converse, *hold down* PTT
- to resume scanning immediately, press ✓

6 Troubleshooting

Below is a checklist for basic troubleshooting.

Check that:

- all connectors are dry and free of dirt
- all connections are sound
- the battery is connected to the transceiver and has some charge
- the selected antenna is appropriate for the distance over which you want to communicate
- the antenna is deployed correctly, oriented in a suitable direction, and connected to the transceiver
- the grounding system is adequate as per instructions provided with the antenna
- the antenna selection icon on the front panel screen matches the type of antenna you are using

If required, restart your transceiver to invoke self-testing. The self-test checks the memory, hardware, LCD and keys.

If a serious fault is reported, contact your Codan representative.

Table 5 contains some general tips for troubleshooting your transceiver.

Table 5: General troubleshooting

Problem	**Solution**
The sound from the front panel speaker is muffled	Drain any moisture from the front panel of the transceiver by turning it upside down.
Communications are not clear	Try another channel. Press PTT. If you are using a whip or long wire antenna, check that the antenna selection icon is **ATU** or **ATU/50** (see Figure 4 on page 28). If you are communicating over a short distance, try laying the whip horizontally for near vertical incident skywave operation. Change to a long wire antenna. If communications are still not clear, change to a dipole or broadband antenna and check that the antenna selection icon is **50** or **ATU/50** (see Figure 4 on page 28).
There are no supports for a wire antenna available	Lay the antenna wire on the ground. Lay the earth lead or counterpoise in the opposite direction.
I get a burn from the handset when I press PTT	The transceiver is not adequately earthed. Attach an earth lead or counterpoise as per the instructions provided with the antenna.
GPS is not working	Ensure that the front panel of the transceiver, and hence the GPS antenna, is facing the sky so that it can receive signals from satellites.

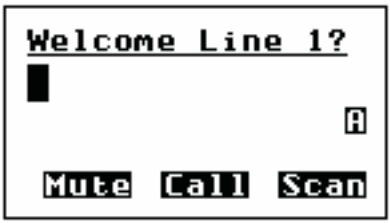
Appendix A—Entering and editing text

Editing a screen

To gain access to an editable screen:

- ❑ *Hold* ✓.

  A question mark is displayed at the end of the heading to show that you can now enter and/or edit text in the setting.



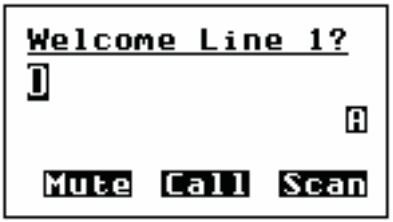
NOTE If text has already been entered on the line it is highlighted.

- ❑ Do one of the following:
  - To use the text displayed, press ✓.
  - To enter new text, start typing. When you have entered the text, press ✓.
  - To edit the text displayed, press ✕. The cursor is placed at the end of the line so you can backspace over characters and/or enter new text. When the text is correct, press ✓.

Entering text

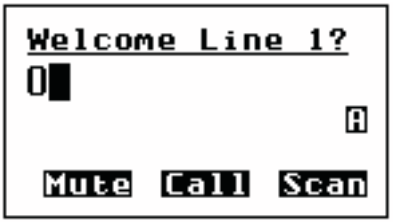
To enter text in an editable screen:

- To enter one of the letters on a key, press the key repeatedly until the letter is displayed.

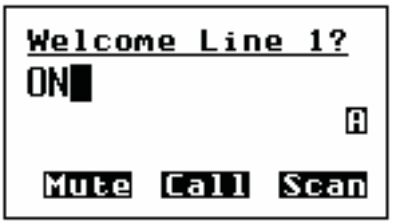


NOTE You can also *hold* the key until the letter you want is displayed, then release the key.

- To enter another letter on the same key, wait until the cursor moves to the next space...

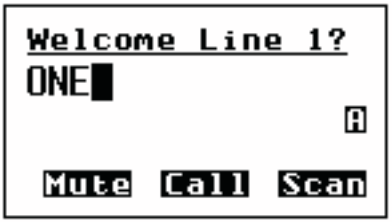


...then press the key repeatedly until the letter you want is displayed.



- To enter a letter on another key, press the key for the letter.

  You do not need to wait until the cursor moves to the next space.



Changing between alpha and numerical characters

To change between upper-case and lower-case letters and numbers in an editable screen:

- ❑ Press **#** to change the character/case indicator at the bottom right of the screen from **A** to **a** to **#**.

NOTE

When you are prompted to enter a call address, the characters that you can enter are determined by the call systems installed in the transceiver.

Moving the cursor

To move the cursor across the text:

- ❑ Use ◣ and ◥ to move the cursor left and right respectively.

Inserting text

To insert text:

- ❑ Use ◣ and ◥ to move the cursor to the point where you want to insert text (or a space), then press the required character key.

NOTE

If you want to insert a space, make sure that **A** or **a** is displayed at the bottom right of the screen before you press **0** otherwise you will enter a zero.

NOTE

You can enter a special character using *, or with and .

Deleting text

To delete text:

- Use and to move the cursor one position to the right of the character that you want to delete, then press .

Saving text changes

To save the changes you have made:

- Press .

  The question mark is removed from the heading.

  If you do not want to save the text, *hold* to discard the changes.

Appendix B—Using Quick Start

Quick Start provides simple methods to configure your transceiver to a basic operating state.

Quick Start will be available if your transceiver contains only one station self address and network names from this default list:

- *Voice
- *Selcall
- *CALM
- !Default

When you *hold* 🔍, you should see the Quick Start entries, for example, **Add/Edit channel**, **Set scan list** etc. If these entries are not displayed, then Quick Start is not available to you.

NOTE

Quick Start is not available in countries that do not permit programming of transmit frequencies using the front panel, for example, the United States of America and Australia.

For detailed information on programming your transceiver without Quick Start see the reference material on the enclosed CD.

Opening and closing Quick Start

To open Quick Start:

❑ *Hold* 🔍.

To close Quick Start:

❑ Press or *hold* ✕.

Adding/Editing a channel

To add or edit a channel:

- ❑ Open Quick Start.
- ❑ Scroll to **Add/Edit channel**, then press ✓.
- ❑ Enter the name of the channel that you want to use, then press ✓.

  NOTE — For help with entering text see page 45, *Entering and editing text*.

  If you want to use an existing channel, scroll to the channel, then press ✓.
- ❑ Enter the receive frequency in kilohertz, then press ✓.

  NOTE — You can enter the frequency to three decimal places. Press * to enter a decimal point, then continue with entering the frequency.
- ❑ Enter the transmit frequency in kilohertz, then press ✓.
- ❑ Scroll to the mode combination you want to use, then press ✓.

  The transceiver will return to Quick Start.
- ❑ If you want to add more channels to your transceiver, scroll to **Add/Edit channel** and repeat this process.
- ❑ Close Quick Start, if required.

  NOTE — If you want to make or receive calls on this new channel, you must add it to your scan list.

Setting up a scan list

To set up a scan list:

- ❑ Open Quick Start.
- ❑ Scroll to **Set scan list**, then press ✓.

  The first channel in the transceiver is displayed.
- ❑ If you want to add this channel to the scan list, press ✓.

  If you do not want to add this channel to the scan list, press ✗.

  When all the channels have been viewed or you have added 20 channels to your scan list, the transceiver will return to Quick Start.

  If you do not want to scroll through all the channels in your scan list, *hold* ✓ to return to Quick Start.
- ❑ Close Quick Start, if required.

CAUTION Each time you enter **Set scan list**, the resulting scan list will overwrite the existing scan list.

Setting the time and date

To set the time and date:

- ❑ Open Quick Start.
- ❑ Scroll to **Set time/date**, then press ✓.

  The display will appear with a line under the day of the month.
- ❑ Use ◣ or ◥ to change the current setting to the correct value, then press ✓.

  The line will appear under the month.
- ❑ Repeat the previous step until you have made all of the changes to the time and date.

When all the changes have been made, the transceiver will return to Quick Start.

- ❑ Close Quick Start, if required.

Setting your station self address

NOTE

When Quick Start is available, any self address that you enter using this method will replace the previous self address. If you want to enter more than one self address, and hence disable the Quick Start features, see the reference material on the enclosed CD.

To set your station self address:

- ❑ Open Quick Start.
- ❑ Scroll to **Set my address**, then press ✔.
- ❑ Enter your station self address (maximum of 6 numeric digits for Codan Selcall, or 15 upper-case/numeric digits if you have the MIL-STD-188-141B ALE option installed), then press ✔.

  NOTE

  For help with entering text see page 45, *Entering and editing text*.

- ❑ Close Quick Start, if required.

Adding/Editing an entry in the Address List or Call Book

To add or edit an address that you call frequently:

- ❑ Open Quick Start.
- ❑ Scroll to **Address/CallBk**, then press ✓.
- ❑ Enter the name of the station or person that you want to add to the list, or use ▶ and ◀ to select an existing entry, then press ✓.

  NOTE — For help with entering text see page 45, *Entering and editing text*.

- ❑ Scroll to the type of call that you want to make, enter the station address that you want to call, then press ✓.
- ❑ If you selected **Message?** or **No call type**, enter the message, then press ✓.

  If you do not want to select a message, press ✓.
- ❑ Scroll to the call system that you want to use to make the call, then press ✓.
- ❑ If you selected **Phone?** or **No call type**, select **<blank>** for the phone link that you want to use, then press ✓.

  When all the changes have been made to the call address, the transceiver will return to Quick Start.
- ❑ If you want to add more call addresses to your Address List or Call Book, scroll to **Address/CallBk** and repeat this process.
- ❑ Close Quick Start, if required.

Deleting an entry

To delete addresses, channels or phone links:

- ❑ Open Quick Start.
- ❑ Scroll to **Delete...**, then press ✓.
- ❑ Scroll to the list from which you want to delete an item, then press ✓.
- ❑ Scroll to the item you want to delete, then press ✓.

NOTE If you delete a channel from the Channel List, it is deleted automatically from the scan list.

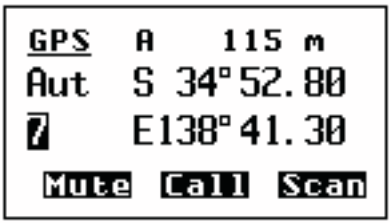
- ❑ Close Quick Start, if required.

Appendix C—Using the GPS receiver

The GPS antenna is located behind the front panel of the transceiver (see Figure 3 on page 23). In order to obtain reliable and accurate GPS information, you should ensure that the front panel of the transceiver is pointed toward the sky and is not shadowed by overhead obstructions.

To access GPS information:

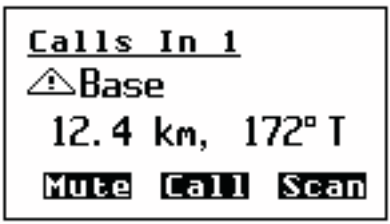
- ❑ Press **GPS** to see the GPS screen.



To calculate distance and bearing to another transceiver:

- ❑ Go to an Address List or Call Log entry containing a GPS position of the other station.

  The transceiver calculates the distance to the other transceiver and its bearing from true north with respect to your current location.



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Appendix D—Transceiver specifications

Table 6: Specifications

Item	Specification
Frequency range	Transmit: 1.6 to 30 MHz Receive: 250 kHz to 30 MHz
Channel capacity	400 channels
Operating modes	Single sideband (J3E) USB and LSB or switched USB/LSB, AM H3E (optional)
Sensitivity	Frequency: 0.25 to 30 MHz — RF amp off: 0.28 µV PD, –118 dBm Frequency: 1.6 to 30 MHz — RF amp on: 0.14 µV PD, –124 dBm For 10 dB SINAD with greater than 50 mW audio output
Power output	25 W PEP ±0.5 dB (high power) 5 W PEP ±0.5 dB (low power)
Antenna tuning times	First time tuning 2.5 s typical Memory tuning 50 ms typical
Approximate battery life	13 Ah NiMh: 50 h 8 Ah NiMh: 30 h 7 Ah SLA: 15 h
Environment	Ambient temperature: –30 to 60°C Relative humidity: 95% non-condensing Derate upper ambient temperature by 1°C per 330 m (360 yd) above sea level

Table 6: Specifications

Item	**Specification**	
Size	2110 including battery:	245 mm W × 350 mm D × 92 mm H (9.8 in W × 14.0 in D × 3.7 in H)
	2110 only:	245 mm W × 250 mm D × 92 mm H (9.8 in W × 10.0 in D × 3.7 in H)
Weight	2110 only:	2.5 kg (5.5 lb)
	13 Ah NiMh battery	2.9 kg (6.4 lb)
	8 Ah NiMh battery	2.1 kg (4.6 lb)
	7 Ah SLA battery	3.2 kg (7.1 lb)
Sealing	IP68; immersion for 1 h at a depth of 1 m (3 ft)	

Appendix E—HF radio transmission

The HF band is the range of frequencies between 3 and 30 MHz. HF transceivers usually cover a frequency range of 1.6 to 30 MHz.

Codan HF transceivers transmit on single sidebands. This reduces the power required to send HF signals and increases the number of channels available within the HF spectrum.

HF transceivers are primarily used for long-range communication where distances of 3000 km (1800 mi) and more are possible. Obstructions such as buildings and mountains have little effect on long-range communication. HF radio can cover such large distances because of the way the transmitted radio signal propagates.

HF radio waves propagate in three ways simultaneously:

- ground wave
- direct wave
- sky wave

Ground wave

The ground wave travels near the ground for short distances, typically up to 100 km (60 mi) over land and 300 km (190 mi) over sea. The distance covered depends upon the operating frequency, transmission power, and type of terrain.

Direct wave

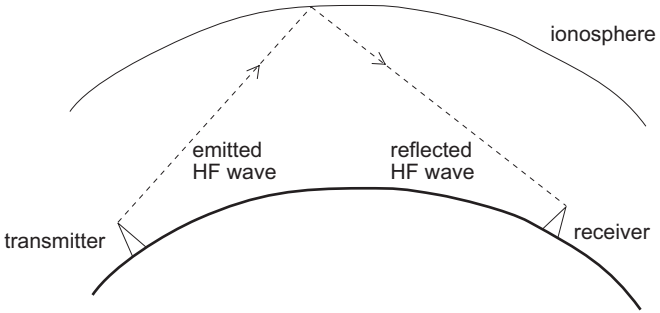
The direct wave travels in a direct line-of-sight from the transmitter to the receiver.

Sky wave

The sky wave is the most important form of HF propagation. The radio wave is transmitted toward the sky and is reflected by the ionosphere to a distant receiver on earth.

The reflective properties of the ionosphere change throughout the day, from season to season, and yearly.

Figure 7: The reflective properties of the ionosphere



Frequency, distance and time of day

The extent to which a radio wave is reflected depends on the frequency that is used. If the frequency is too low, the signal is absorbed by the ionosphere. If the frequency is too high, the signal passes straight through the ionosphere. Within the HF band, low frequencies are generally considered to be in the range of 2 to 10 MHz. High frequencies are above 10 MHz.

A frequency chosen for daytime transmission may not necessarily be suitable for night-time use. During the day, the layers of the ionosphere are thick. The layers absorb lower frequencies and reflect higher frequencies. At night, the ionosphere becomes very thin. The low frequencies that were absorbed during the day are reflected and the high frequencies that were reflected during the day pass straight through.

Summer HF communications usually operate on higher frequencies than those used in winter over the same distance.

Solar activity varies over an 11 year cycle. Higher frequencies need to be used during periods of peak activity.

It is important to remember that you may need to change the frequency you are using to achieve the best communication. The general rules of thumb for HF communication are:

- the higher the sun, the higher the frequency
- the further the distance, the higher the frequency

Antenna selection

The selection of an appropriate antenna is critical to the success of your communications (see page 21, *Selecting an appropriate antenna*).

Channels and modes

A channel is a name that is given to a frequency or a pair of frequencies, e.g. ‘Channel 1’, ‘4500’ and ‘Headquarters’. The frequencies may be any frequencies within the HF range.

Each channel has one or more modes associated with it. Each mode indicates a sideband that can be used with the channel, such as USB or LSB. When you make a call you need to specify the channel *and* the mode you want to use.

Table 7 shows examples of channels and the information associated with them.

Table 7: Examples of channels and modes

Channel	Receive frequency (kHz)	Transmit frequency (kHz)	Modes
Channel 1	10600	10600	LSB, USB
4500	4500	–	AM
Headquarters	22758	23000	USB

Networks and scanning

A network is two or more stations that use the same frequencies and call system to communicate.

The frequencies are allocated by a government authority and enable the network to maintain HF communication throughout the day and night.

The call system is the method the network uses to make and receive calls. For example, in networks that use the Codan Selcall call system to make calls, the user enters the address of the station they want to call, then selects the channel/mode on which to make the call. In networks that use the ALE/CALM call system, the transceiver selects the best channel/mode for the call.

The transceiver can be set to scan the channel/modes used by your network to detect incoming calls. It is recommended that when you are not using the transceiver to communicate you switch scanning on. This ensures that you can receive calls from stations in your network.

Etiquette for the use of HF radio

There is a standard procedure for communicating over HF radio. Before you begin transmitting, switch off scanning, select a channel, then press PTT on the handset to initiate tuning of the antenna. Listen to the channel that you are going to use and ensure that there is no voice or data communication taking place. You may need to wait until the channel is clear or select another channel.

When you first establish communication with another station it is customary to state their call sign and then your own using the phonetic alphabet (see Table 8 on page 63). For example:

‘Alpha Bravo One, this is Alpha Bravo Two. Do you receive me? Over.’

In this example your call sign is AB2 and you are calling a station with the call sign AB1. A call sign is a group of letters and numbers issued by a government authority to identify a station. The phonetic alphabet is used to ensure that your call sign is understood.

The word ‘over’ is used to signify the end of your transmission. The transceiver may be set up to transmit a short beep when you release the PTT button on the handset. When your conversation with the other party is finished, the party that speaks last should say ‘out’.

Swearing or foul language should not be used—heavy penalties can apply.

Keep communication as short as possible.

Table 8: The phonetic alphabet

Letter	**Word**	**Letter**	**Word**
A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

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Standards and icons

The following standards and icons are used in this guide:

This typeface	Means...
Italic	a cross-reference or text requiring emphasis

This icon	Means...
❑	a step within a task
NOTE	the text provided next to this icon may be of interest to you
CAUTION	proceed with caution as your actions may lead to loss of data, privacy or signal quality
WARNING	your actions may cause harm to yourself or the equipment

Acronyms and abbreviations

This term	Means...
ALE	automatic link establishment
AM	amplitude modulation
BER	bit error rate
CALM	Codan automated link management
CW	carrier wave
DC	direct current
DSP	digital signal processor
ETSI	European Telecommunications Standards Institute
GPIO	general purpose input/output
GPS	global positioning system
HF	high frequency
ID	identification
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IF	intermediate frequency
LBT	listen before transmit
LCD	liquid crystal display
LED	light emitting diode
LSB	lower sideband
LQA	link quality analysis
NiMh	nickel metal hydride
NSP	NGT system programmer

This term	Means...
PA	power amplifier
PC	personal computer
PTT	press-to-talk
RF	radio frequency
R&TTE	radio and telecommunications terminal equipment
Rx	receive
SB	sideband
SINAD	(signal + noise + distortion)-to-(noise + distortion) ratio
SLA	sealed lead acid
tcvr	transceiver
Tx	transmit
USB	upper sideband
V	firmware/software version

Glossary

This term	Means...
active line	The line below the title of a list on the front panel screen. Items in the active line are selected by pressing ✔.
address	The HF transceiver equivalent of a telephone number. Your station self address is used by other stations to call you, and it is sent when you make calls to identify you as the caller. It is sometimes referred to as an ID, a station ID, or a self ID.
MIL-STD-188-141B ALE option	An option that enables you to make ALE ALL, ANY, Group Selective, NET and Wildcard calls, and perform LQA reporting and AMD messaging.
call detect time	The length of time during scanning that the transceiver pauses on each channel in order to detect an incoming call. It is the inverse of the scan rate.
channel	Frequencies programmed in the transceiver to transmit and receive signals on air.
Channel Test call	A call that enables you to test the quality of a channel. It is sometimes referred to as a Beacon call. Channel Test calls may be made in an ALE/CALM network to replace information in the LQA database, and to perform a manual sounding operation (if you have the MIL-STD-188-141B ALE option installed).
Emergency call	A call that enables you to trigger an emergency alarm at a specific station then speak to an operator there.
frequency	The number of cycles per second of a radio wave, usually expressed in kilohertz.

This term	Means...
Get Position call	A call that gets the GPS position of a specific station.
Get Status call	A call that gets diagnostic or configuration information about the transceiver at a specific station.
front panel	The interface that is used to control the functions of the 2110 SSB Transceiver. It consists of a display, keypad and connectors for the handset, antenna, ancillary equipment, and earthing.
hot key	A key on the front panel that is pre-programmed with a macro that enables you to perform a task quickly.
Last Heard Log	A log of the last 100 on-air transmissions detected by the current station. The Last Heard Log is available if the MIL-STD-188-141B ALE option is installed.
listen before transmit	If enabled, the automatic process that the transceiver uses to detect whether or not there is traffic on a channel and, when necessary, select another channel or inform the user that the channel is busy.
LQA beacon	A Channel Test call made in an ALE/CALM network using a Group Selective or NET address syntax. On completion of the beacon, the information collected replaces the information for the channel stored in the LQA database. It is sometimes referred to as an ALE beacon. The LQA beacon is available if the MIL-STD-188-141B ALE option is installed.

This term	Means...
macro	A short set of instructions to automate a task you perform with the transceiver. When a macro is assigned to a key, the key becomes a hot key.
manual sounding	A Channel Test call made in an ALE/CALM network using the text **SOUNDING** as the call address. The station performs a sounding operation, which other stations use to update the information in their LQA database. Manual sounding is available if the MIL-STD-188-141B ALE option is installed.
Message call	A call that enables you to send a message to a specific station.
mode	A type of reception or transmission you can use with a channel, comprising a sideband and an IF filter.
network	Two or more stations that use the same frequencies and call system to communicate.
Phone call	A call that enables you to connect to a public telephone network.
PTT button	Press-to-talk button, located on the left side of the handset. This button enables you to communicate during voice calls, switch mute off, cancel voice calls prior to the point where voice can be transmitted, cancel calls where data is being transmitted, and exit out of editable screens without saving changes.
revertive	A signal sent by a station in response to a call.

This term	Means...
transceiver unit	The device that modulates audio signals onto radio frequencies that can be transmitted on air, and that demodulates the radio frequencies it receives into audio signals.
Selective call	A call that enables you to contact a specific station then speak to an operator.
Send Position call	A call that sends your GPS position to a specific station.
sideband	A band of frequencies that is above or below a modulated carrier frequency.
station	A point of communication consisting of a transceiver, a battery, an antenna, ancillary equipment, and appropriate connecting cables.
transceiver	A transceiver unit with speaker, handset, and battery.

Units

NOTE Imperial dimensions are in United States Customary Units.

Measurement	Unit	Abbreviation
Length	metre (inch/feet/yard/ mile)	m (in/ft/yd/mi)
Frequency	hertz	Hz
Time	second	s
	hour	h
Voltage	volt	V
Weight	gram (pound)	g (lb)

Unit multipliers

NOTE Units are expressed in accordance with ISO 1000:1992 ‘SI units and recommendations for the use of their multiples and of certain other units’.

Unit	Name	Multiplier
M	mega	1 000 000
k	kilo	1 000
m	milli	0.001

About this issue

This is the first issue of the 2110 SSB Transceiver Getting Started Guide.

Associated documents

This guide is one of a series of documents associated with the 2110 SSB Transceiver. The other documents are:

- 2110 SSB Transceiver Reference Manual (Codan part number 15-04135-EN) supplied on the CD inside the back cover of this guide
- 2110 SSB Transceiver Technical Service Manual (Codan part number 15-02071-EN)
- 2110 SSB Transceiver Repair Guide (Codan part number 15-04139-EN)
- Declaration of Conformity for the 2110 SSB Transceiver (Codan part number 19-40157)

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Appendix G—Warranties

Codan's warranty statement is provided on the International Product Warranty Card (Codan part number 12-50144). This statement sets out standard use and misuse under the terms of the warranty.

The following warranties are supplied with the 2110 SSB Transceiver and accessories:

Item	Warranty period
2110 SSB Transceiver	3 years ex-factory
NiMh battery pack	3 years ex-factory
SLA battery pack	1 year ex-factory
Battery chargers	3 years ex-factory
Antennas	1 year ex-factory
Backpacks	1 year ex-factory

NOTE

If the transceiver or battery pack are opened then care must be taken when re-assembling to ensure that water tight seals retain integrity. Inspect all gaskets prior to closing and replace any that appear damaged. Original screws must be used. Failure to do so may void a warranty claim associated with moisture ingress. Replacement gaskets and screws are available as spares from your Codan representative.

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CODAN

www.codan.com.au

Head Office

Codan Limited
ABN 77 007 590 605
81 Graves Street
Newton SA 5074
AUSTRALIA
Telephone +61 8 8305 0311
Facsimile +61 8 8305 0411

asiasales@codan.com.au

Codan (UK) Ltd
Gostrey House
Union Road
Farnham Surrey GU9 7PT
UNITED KINGDOM
Telephone +44 1252 717 272
Facsimile +44 1252 717 337

uksales@codan.com.au

Codan US, Inc.
8430 Kao Circle
Manassas VA 20110
USA
Telephone +1 703 361 2721
Facsimile +1 703 361 3812

ussales@codan.com.au

Codan Limited
ABN 77 007 590 605
105 Factory Road
Oxley Qld 4075
AUSTRALIA
Telephone +61 7 3716 6333
Facsimile +61 7 3716 6350